

REMARKS

Claims 21-27 and 30-34, 36-40 and 41-49 are pending in this application. The Office Action Summary indicates that claims 1-20 and 28 are withdrawn. Applicants submit that claims 1-20 were cancelled in the April 25, 2000 Preliminary Amendment, and claim 28 was cancelled in the December 23, 2002 Amendment.

By this Amendment, the drawings are corrected pursuant to the attached drawing sheets, claims 29, 35 and 41 are cancelled without prejudice to or disclaimer of the subject matter contained therein, and claims 21, 27, 30, 34, 40, 46 and 47 are amended. No new matter is added by any of these amendments. Reconsideration based on the following remarks is respectfully requested.

I. The Drawings Satisfy All Formal Requirements

The Office Action objects to the drawings based on informalities. Figures 1-2 are corrected pursuant to the attached drawing sheets with annotations marked in red. Formal Drawings will be filed upon Notice of Allowance. In addition, claims 21, 27, 30, 34, 40, 46 and 47 have been amended to obviate this objection. Withdrawal of the objection to the drawings is respectfully requested.

II. The Claims Satisfy the Requirements under 35 U.S.C. §112, first paragraph

The Office Action rejects claims 21-27 and 29-49 under 35 U.S.C. §112, first paragraph, based on lack of enablement. Claims 21, 27, 30, 34, 40, 46 and 47 have been amended to obviate this rejection. Withdrawal of the rejection under 35 U.S.C. §112, first paragraph is respectfully requested.

III. Claims 21-27 and 49 Define Patentable Subject Matter

The Office Action rejects claims 21, 22, 25-27, 29 and 49 under 35 U.S.C. §103(a) over U.S. Patent 5,688,551 to Littman *et al.* (Littman) in view of U.S. Patent 5,779,937 to Sano *et al.* (Sano) and U.S. Patent 5,754,262 to Lengyel. The Office Action further rejects claim 23 under 35 U.S.C. §103(a) over Littman in view of Sano and Lengyel and further in

view of U.S. Patent 5,847,506 to Nakayama *et al.* (Nakayama). The Office Action further rejects claim 24 under 35 U.S.C. §103(a) over Littman in view of Sano and Lengyel and further in view of U.S. Patent 6,091,382 to Shioya *et al.* (Shioya). These rejections are rendered moot with respect to claim 29, and are respectfully traversed for the remaining claims.

A *prima facie* case of obviousness for a §103 rejection requires satisfaction of three basic criteria: there must be some suggestion or motivation either in the references or knowledge generally available to modify the references or combine reference teachings, a reasonable expectation of success, and the references must teach or suggest all the claim limitations. See MPEP §706.02(j). Applicants respectfully assert that the Office Action fails to satisfy this burden using the applied references or their combination.

Littman, Sano and Lengyel, alone or in combination, do not teach or suggest a light source including a plurality of organic electroluminescent elements arrayed in a common plane parallel to a support surface of a substrate, the plurality of organic electro-luminescent elements emitting light simultaneously, P being a distance in the common plane between centers of adjacent organic electroluminescent elements and D being a distance between each organic electroluminescent element and a display surface of a liquid crystal display element, and a relationship between D and P being such that D is 10 times P or more, as recited in claim 21.

Instead, Littman discloses a method of forming an organic electroluminescent (EL) device 100. In particular, Littman teaches a transparent substrate 110 having column electrodes 120 overlaid by organic EL media 130 that are overlaid by row electrodes 140. The electrodes 120 and 140 are laterally spaced for electrical insulation. See col. 3, lines 26-63 and Fig. 1 of Littman.

Also, Sano discloses an organic electroluminescent device including a chelate compound. In particular, Sano teaches a glass substrate 1 having an ITO electrode 2 of

2000Å thickness. See col. 9, lines 54-67 and Fig. 1 of Sano.

Further, Lengyel discloses a liquid crystal display (LCD) 100 having a contrast enhancement filter to operate under bright ambient conditions. In particular, Lengyel teaches a backlit assembly 102 separated from a display element 103 by 1 to 5 mm, and the display element 103 having linear polarizers 112, 120. Lengyel further teaches a contrast enhancement assembly 105 with a filter 130 that absorbs a portion of light outside the visible spectrum. See col. 4, lines 27-34, col. 5, lines 45-49, col. 6, lines 4-18 and Fig. 1 of Lengyel.

Applicants respectfully assert that persons of ordinary skill in the art lack any motivation to combine disclosures directed to organic electroluminescent (EL) devices and those directed to liquid crystal displays. These technologies and their applications can be readily distinguished.

For example, Lengyel teaches the LCD 100 with for a high intensity backlight source, preferably at least 5000 fL (foot-lumens) of luminance. See col. 4, lines 34-36 of Lengyel. In contrast, Applicants observe that organic EL elements should emit light as high as 10,000 cd/m² (candela/sq-meter) or less than 3000 fL. See page 2, lines 10-11 in the specification. Clearly, organic EL devices would typically be inadequate for the application in Lengyel.

In addition, Lengyel describes an air gap 110 between the backlight 102 and the display element 103 for augmenting heat transfer. See col. 5, lines 24-32 of Lengyel. However, such measures might conceivably be required for a high intensity light source, whose total efficiency is degraded by linear polarizers 112. In contrast, Applicants' claimed features are directed to thermal management for organic EL devices, not for LCDs. Lengyel provides no teaching or suggestion to modify its teachings to achieve this effect.

Further, while Littman and Sano are directed to organic EL devices, neither of these applied references addresses thermal management of the light emitters. Organic EL devices may be subject to chemical degradation caused by excess heat, which is mitigated by Applicants' claimed features.

Also, Littman teaches that the spacing between the donor sheet and the EL substrate may be held apart by “as large as a few times” the sub-pixel pitch. See col. 5, lines 56-40 of Littman. In contrast, Applicants’ claimed features are directed to D being ten times P or more. Claim 21 is thus directed to at least an order of magnitude dimensional difference, whereas Littman teaches merely a modest factor, in contrast to the Office Action inherency assertions at page 17. Sano offers no suggestion to the contrary regarding this distances relationship.

Applicants submit that there is no motivation to combine features related to the organic EL media of Littman and/or the chelate device of Sano with the LCD linear polarizers of Lengyel. As discussed above, the light intensity required for Lengyel exceeds that available for organic EL devices. Similarly, the applied references fail to teach or suggest the features recited in dependent claims 22 and 25-27. Thus, the Office Action has not established a *prima facie* case of obviousness.

Nakayama does not compensate for the deficiencies of Littman, Sano and Lengyel outlined above for claim 21. Nor does Nakayama teach, disclose or suggest the additional features for optical micro-resonators recited in claim 23. Instead, Nakayama discloses an organic light emitting device with successive layers including a glass substrate 1, a reflective film 2, a conductive film 3, a hole injecting layer 4, a light emitting layer 5, an electron injecting layer 6, and electrodes 7. Nakayama provides no teaching or suggestion of a micro-resonator structure. In particular, Nakayama teaches that the reflective film 2 generates an electromagnetic wave of resonant frequency. See col. 3, line 61 – col. 4, line 10, col. 4, lines 51-64 and Fig. 1 of Nakayama.

However, Applicants respectfully assert that that a resonating reflective film is not analogous to an optical micro-resonators that serves as the organic EL light source. Thus, any combination of Littman, Sano and Nakayama fails to teach or suggest all of Applicants’ claimed features. As discussed earlier, Applicants further assert further that motivation is

lacking to combine these teachings with Lengyel, and that even such a combination would lack all of Applicants' features in independent claim 21, and also the dependent claims.

Further, Shioya does not compensate for the deficiencies of Littman, Sano and Lengyel outlined above for claim 21. Nor does Shioya teach, disclose or suggest the additional features for anode and cathode striped patterns recited in claim 24. Instead, Shioya discloses a display device having low pixel cross-talk. In particular, Shioya teaches an organic electroluminescent element 11 in which striped cathode electrodes 13 are formed on a transparent substrate 12, and a photoconductive layer 14 covers the substrate 12 and electrodes 13. Shioya further teaches an electron transport layer 15, a luminescent layer 16 and an anode electrode 17 are sequentially stacked on the layer 14. See col. 5, line 59 – col. 6, line 12 and Fig. 1 of Shioya.

While Shioya provides a timing chart for applying drive voltages between adjacent cathode nodes, these pulses are provided in staggered consecutive order for the respective EL elements according to color. See col. 12, line 57 – col. 13, line 39 and Fig. 17 of Shioya. In contrast, Applicants' claimed features provide for electric current applied in a simultaneous pulse mode for the electrodes, and for intensity control by amplitude variation of the current. Shioya fails to teach or suggest such features directed to simultaneity in current application.

For at least these reasons, Applicants respectfully assert that independent claim 21 is patentable over the applied references. Dependent claims 22-27 and 49 are likewise patentable over the applied references for at least the reasons discussed as well as for the additional features they recite. Withdrawal of the rejections of claims 21-27 and 49 under 35 U.S.C. §103(a) is respectfully requested.

IV. Claims 30-34, 36-40 and 42-48 Define Patentable Subject Matter

The Office Action further rejects claims 30, 31, 33-35, 38, 40, 41 and 44 under 35 U.S.C. §103(a) over U.S. Patent 5,185,712 to Sato *et al.* (Sato) in view of Shioya. The Office Action further rejects claims 32, 36, 37, 39, 42, 43 and 45-48 under 35 U.S.C. §103(a) over

Sato in view of Shioya and further in view of U.S. Patent 5,707,745 to Forrest *et al.* (Forrest). These rejections are rendered moot with respect to claims 35 and 41, and respectfully traversed for the remaining claims.

Sato and Shioya do not teach or suggest a display device including, *inter alia*, a light source having an organic electroluminescent element (20), a liquid crystal display element (21), an optical system (23), the organic electroluminescent element having a luminescent region having substantially the same size as that of a display area of the display element, and a pulse current supply source (25) to the organic electroluminescent element, as recited in claim 30, and similarly recited in claim 46. Also, Sato and Shioya fail to teach or suggest a similar display device having first, second and third organic electroluminescent elements, as recited in claims 34, 40 and 47.

Instead, Sato discloses a viewfinder 10 having a liquid crystal display (LCD) panel 12 with adjacently mounted display sections 13R, 13G, 13B and reflecting mirrors 17, 18, 19 to reflect light from the display sections to an eyepiece 16 through a mirror barrel 15. See col. 3, lines 28-42, col. 4, lines 26-36 and Fig. 2 of Sato.

Further, Shioya discloses the low pixel cross-talk display, as discussed above for claim 24. In particular, Shioya teaches consecutive drive voltage pulses according to element color. See col. 13, lines 11-24 of Shioya. As discussed above, Applicants' claimed features provide for electric current applied in a simultaneous pulse mode for the electrodes, which Shioya fails to teach or suggest.

As discussed above for claim 21, Applicants respectfully assert that persons of ordinary skill in the art lack any motivation to combine disclosures directed to organic EL devices and those directed to liquid crystal displays. These technologies and their applications can be readily distinguished.

Sato and Shioya are directed to LCD and organic EL technologies, respectively. There is insufficient overlap to provide motivation to combine or modify the teachings of

these applied references. In particular, Sato utilizes a backlight 14 radiating white light which is separated by color filters. See col. 4, lines 18-23 of Sato. Applicants' claims 34 and 40 recite three distinct EL light sources, each having a specific individual color. Thus, Sato teaches away from Applicants' claimed features. Also, because Sato describes a fluorescent source (col. 1, lines 32-33), such teaching also mitigates against establishing motivation to modify Sato or combine with Shioya to use EL devices. Even if such motivation were established, any such combination would nonetheless fail to teach or suggest Applicants' claimed features.

Additionally, Forrest does not compensate for the deficiencies of Sato and Shioya outlined above for claims 30, 34 and 40. Nor does Forrest teach, disclose or suggest the features recited in claims 46 and 47. Instead, Forrest discloses vertically stacked layers of double heterostructure light emitting diodes (LEDs) 20, 21, 22 on a glass substrate 37. In particular, Forrest teaches such devices, *e.g.*, LED 20 as consisting of an HTL layer 20H disposed on an ITO layer 35, with an EL layer 20E sandwiched between a top ETL layer 20T and the HTL layer 20H. These LEDs are superposed one above the other. See col. 4, lines 4-25, col. 5, lines 4-18 and Figs. 2A-2C and 14A of Forrest. Thus, Forrest teaches away from Applicants' claimed features regarding elements in a common plane of a substrate support surface.

Applicants assert that there is no motivation to combine features related to the liquid crystal display (LCD) panel of Sato with the electroluminescent elements of Shioya or the stacked LEDs of Forrest, nor has the Office Action established sufficient motivation or a *prima facie* case of obviousness. The differences between the LCD and EL technologies preclude any such combination. Withdrawal of the §103 rejections of independent claims 30, 34, 40, 46 and 47, and dependent claims 32-34, 36-39, 42-45 and 48 under 35 U.S.C. §103(a) is respectfully requested.

For at least these reasons, Applicants respectfully assert that independent claims 30, 34, 40, 46 and 47 are now patentable over the applied references. Their dependent claims are likewise patentable over the applied references for at least the reasons discussed as well as for the additional features they recite. Thus, Applicants respectfully request that the rejections to claims 30-34, 36-40 and 42-48 under 35 U.S.C. §103(a) be withdrawn.

V. Conclusion

In view of the foregoing, Applicants respectfully submit that this application is in condition for allowance. Favorable reconsideration and prompt allowance are earnestly solicited.

Should the Examiner believe that anything further is desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned representative at the telephone number listed below.

Respectfully submitted,



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Attachment:

Drawing Sheets Figs. 1-2

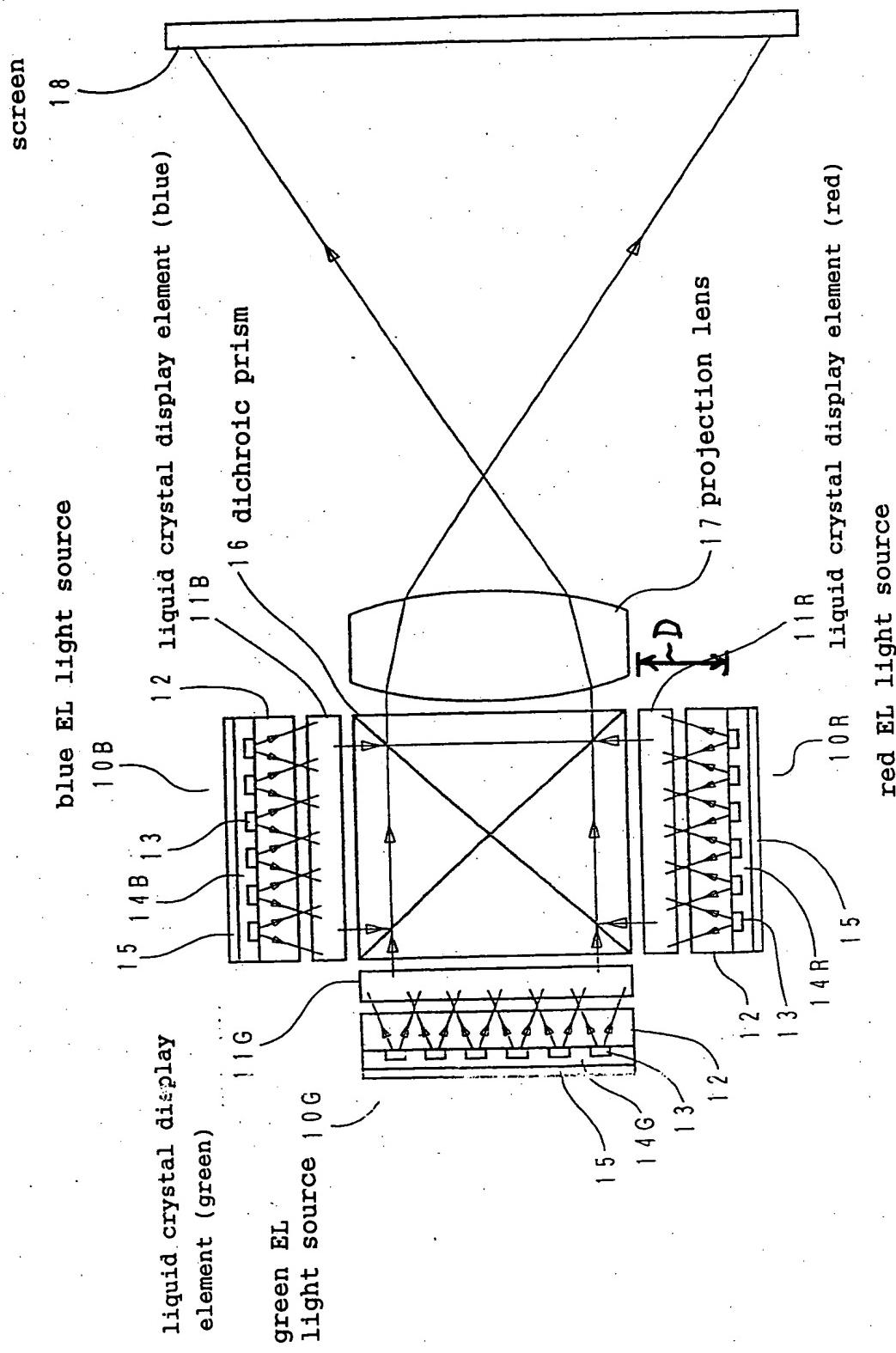
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Fig. 1





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Application No. 09/530,099
Annotated Sheet

Fig. 2

